

## **Types of PPE Used**

All personal protective clothing and equipment must be of safe design and construction for the work to be performed and must be maintained in a clean and reliable condition. Protective clothing and equipment used must meet NIOSH (National Institute for Occupational Safety and Health) or ANSI (American National Standards Institute). Newly purchased PPE must conform to the updated ANSI standards, which have been incorporated into the OSHA PPE regulations, as follows:

- Eye and Face Protection - ANSI Z87.1-1989
- Head Protection - ANSI Z89.1-1986
- Foot Protection - ANSI Z41.1-1991
- Hand Protection - there are no ANSI standards for gloves; however, selection must be based on the performance characteristics of the glove in relation to the tasks to be performed

### **Eye and Face Protection**

Prevention of eye injuries requires that all persons who may be in eye hazard areas wear protective eyewear. This includes employees, visitors, researchers, contractors, or others passing through an identified eye hazard area. To provide protection for these personnel, supervisors of such areas shall purchase a sufficient quantity of goggles and/or plastic eye protectors, which afford the maximum amount of protection possible. If these personnel wear personal glasses, they shall be provided with a suitable eye protector to wear over them.

Suitable protectors must be used when employees are exposed to hazards from flying particles, molten metal, acids or caustic liquids, chemical liquids, gases, or vapors, bioaerosols, or potentially injurious light radiation.

### **Guidelines for protective eyewear**

Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment.

- Side protectors shall be used when there is a hazard from flying objects.
- Goggles and face shields shall be used when there is a hazard from chemical splash.
- Face shields shall only be worn over primary eye protection (safety glasses or goggles).
- Eye protection must not interfere with the function of other required PPE.
- Eye protection must not restrict vision or movement.
- Eye protection should be easy to clean and disinfect.
- It must be reasonably comfortable to wear.
- Equipment fitted with appropriate filter lenses shall be used to protect against light radiation.
- Tinted and shaded lenses are not considered filter lenses unless they are marked or identified as such.

- Eye and face PPE must be distinctly marked to facilitate identification of the manufacturer.

### **Prescription Safety Eyewear**

OSHA regulations require that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design, or shall wear eye protection that can be worn over the prescription lenses (goggles, faceshields) without disturbing the proper position of the prescription lenses or the protective lenses.

### **Emergency Eyewash Facilities**

Emergency eyewash facilities meeting the requirements of ANSI Z358.1 will be provided in all areas where the eyes of any employee may be exposed to corrosive materials. All such emergency facilities will be located where they are easily accessible in an emergency.

### **Head Protection**

Head protection will be furnished to, and used by, all employees and contractors engaged in construction and other miscellaneous work. Head protection must also to be worn by engineers, inspectors, and visitors at construction sites when hazards from falling or fixed objects, or electrical shock are present. Bump caps/skull guards will be issued and worn for protection against scalp lacerations from contact with sharp objects. However, they will not be worn as substitutes for safety caps/hats because they do not provide protection from high impact forces or penetration by falling objects.

In general, protective helmets or hard hats should:

- Resist penetration by object
- Be water resistant and slow burning
- Absorb the shock of a blow
- Come with instructions explaining proper adjustment and replacement of the suspension and headband

Hard hats require a hard outer shell and a shock-absorbing lining. The lining should incorporate a headband and straps that suspend the shell from 1 to 1 ¼ inches away from the users head. This design provides shock absorption during impact and ventilation during use.

Protective helmets purchased after July 5, 1994, must comply with ANSI Z89.1-1986, those purchased before this date must meet the ANSI Z89.1-1969 standard. Employers should train their employees in the proper use and maintenance of the hats including daily inspections. This will help to prolong the helmets effective use and save the employer money from purchasing new helmets frequently. If employees identify any of the following defects, remove the hard hats from service. The suspension system shows signs of deterioration such as:

- Cracking, tearing, or fraying
- The suspension system no longer holds the shell from 1 to 1 ¼ inches away from the employee's head
- The brim is cracked, perforated, or deformed
- The brim or shell shows signs of exposure to heat, chemicals, ultraviolet light, or other radiation

## **Foot and Leg Protection**

Employers must provide foot and leg protection if the workplace hazard assessment reveals potential dangers to these parts of the body. The type of foot or leg protection needed will depend upon the specific hazard you identify and the specific part of the foot or legs exposed to potential injury. Safety footwear must meet the minimum compression and impact performance standards and testing requirements by ANSI. All safety footwear must comply with ANSI Z41-1991, "American National Standard for Personal Protection - Protective Footwear."

Safety shoes or boots with impact protection are required to be worn in work areas where carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection are required for work activities involving skid trucks (manual materials handling cars) or other activities in which materials or equipment could potentially roll over an employee's feet. Safety shoes or boots with puncture protection are required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

## **Hand Protection**

Suitable gloves shall be worn when hazards from chemicals, cuts, lacerations, abrasions, punctures, burns, biologicals, and harmful temperature extremes are present. Glove selection shall be based on performance characteristics of the gloves, conditions, duration of use, and hazards present. One type of glove will not work in all situations.

The first consideration in the selection of gloves for use against chemicals is to determine, if possible, the exact nature of the substances to be encountered. Read instructions and warnings on chemical container labels and MSDSs before working with any chemical. Chemicals eventually permeate all glove materials. However, they can be used safely for limited time periods if specific use and other characteristics (i.e., thickness and permeation rate and time) are known.

## **Body Protection**

Employers must provide body protection for employees if they are threatened with bodily injury while performing their jobs, and if engineering and administrative controls have failed to eliminate these hazards. Workplace hazards that could cause bodily injury include the following:

- Intense heat or cold
- Splashes of hot metals or liquids

- Impact from tools, machinery, and materials
- Cuts
- Hazardous chemicals
- Contact with potentially infectious materials
- Radiation

Employers need to provide PPE only for the parts of the body exposed to possible injury. Depending on the hazards in the workplace, the employer may provide employees with one or more of the following: vest, jackets, aprons, coveralls, surgical gown, and full body suits. The use of PPE especially full body suits can add to the heat stress and workload of the employees. Workers must be monitored closely for heat stress if required to wear full body suits.

### **Selection guidelines for head protection.**

All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors

### **Selection guidelines for foot protection.**

Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate. Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving manual material handling carts, around bulk rolls (such as paper rolls), and around heavy pipes, all of which could potentially roll over an employee's feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

### **Selection guidelines for hand protection.**

Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. Other factors to be considered for glove selection in general include:

- As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types.
- The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

- The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects.
- Generally, any “chemical resistant” glove can be used for dry powders.
- For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials.
- Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

### **Cleaning and maintenance.**

It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision. For the purposes of compliance with 1910.132 (a) and (b), PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.